

Appendix F

Operating and Emergency Procedures

Name of Licensee_____

Operating Procedures

Training

Prior to handling and operating portable gauges, authorized users will complete either a eight hour training course by the manufacturer of the device or any agency approved course.

Personnel Dosimetry

- If personnel dosimetry is provided:
 - Always wear your assigned thermoluminescent dosimeter (TLD) or film badge whenever handling, transporting or operating a nuclear gauge.
 - Never wear another person's TLD or film badge.
 - Personnel dosimetry will be worn at the chest or waist level. Badges will not be worn during non-occupational radiation exposures (e.g. medical or dental x-rays, etc.)
 - Never store your TLD or film badge near the gauge.
 - The RSP will be immediately notified if personnel dosimetry is lost or damaged.

Availability of Procedures

- A complete and current copy of the operating and emergency procedures will accompany portable gauges at all times.
- Copies of the manufacturer's operation manual are maintained on file by the RSO for ready reference.

ALARA Philosophy

- All personnel involved with portable gauges will commit to practice the ALARA philosophy – keep radiation exposure As Low As Reasonably Achievable. The objective is to reduce occupational and public exposures as far below regulatory limits as possible by means of good work practices.
- The following methods will be used to reduce dose:
 - Minimize the **TIME** spent in close proximity to the gauge (the shorter the time, the lower the dose). Work quickly. Return the gauge to storage when not needed.
 - Maximize the **DISTANCE** from the gauge (do not get closer than necessary.) Transport the gauge away from the driver.
 - Make use of available **SHIELDING** to block out radiation

Security

- Before removing the gauge from its place of storage, ensure that, where applicable, each gauge source is in the fully shielded position and that in gauges with a movable rod containing a sealed source, the source rod is locked (e.g., keyed lock, padlock, mechanical control) in the shielded position. Place the gauge in the transport case and lock the case.
- Always maintain constant surveillance and immediate control of the gauge when it is not in storage. At job sites, do not walk away from the gauge when it is left on the ground. Take actions necessary to protect the gauge and yourself from danger of moving heavy equipment.
- Always keep unauthorized persons away from the gauge.
- When the gauge is not in use at a temporary jobsite, place the gauge in a secured storage location (e.g., locked in the trunk of a car or locked in a storage shed).
- Sign out the gauge in a log book (that remains at the storage location) including the date(s) of use, name(s) of the authorized users who will be responsible for the gauge, and the temporary jobsite(s) where the gauge will be used.

Transportation

Before transporting a gauge it should be checked to see that the case is in good condition and that it has all the required labels and shipping paper are accessible to the driver during transport. Refer to Appendix M – “Major DOT Regulations; Sample Bill of Lading” of Regulatory Guide 3.4 Radioactive, “Material Guidance for Portable Gauges and X-ray Fluorescence Analyzers” for additional transportation information.

- Prior to shipping the transport containers will be inspected to ensure proper packaging and that the case is in good condition.
- Block and brace the gauge to prevent movement during transport and lock the gauge in or to the vehicle. Follow all applicable Department of Transportation (DOT) requirements when transporting the gauge.
- The transport containers will be secured away from the passenger compartment.
- Prior to transporting the gauge, ensure that, where applicable, each gauge source is in the fully shielded position. Ensure that in gauges with a movable source rod, the source rod is locked in the shielded position (e.g., keyed lock, padlock, mechanical control). Place the gauge in the transport case and lock the case.
- Return the gauge to its proper locked storage location at the end of the work shift.
- Log the gauge into the daily use log when it is returned to storage.

General Rules of Use

- Use the gauge according to the manufacturer's instructions and recommendations.
- Do not touch the unshielded source rod with your fingers, hands, or any part of your body.
- Do not place hands, fingers, feet, or other body parts in the radiation field from an unshielded source.
- Unless absolutely necessary, do not look under the gauge when the source rod is being lowered into the ground. If you must look under the gauge to align the source rod with the hole, follow the manufacturer's procedures to minimize radiation exposure.
- After completing each measurement in which the source is unshielded, immediately return the source to the shielded position.
- If gauges are used for measurements with the unshielded source extended more than 3 feet beneath the surface, use piping, tubing, or other casing material to line the hole from the lowest depth to 12 inches above the surface. If the piping, tubing, or other casing material cannot extend 12 inches above the surface, cap the hole liner or take other steps to ensure that the hole is free of debris (and it is unlikely that debris will re-enter the cased hole) so that the unshielded source can move freely (e.g., use a dummy probe to verify that the hole is free of obstructions).
- After making changes affecting the gauge storage area (e.g., changing the location of gauges within the storage area, removing shielding, adding gauges, changing the occupancy of adjacent areas, moving the storage area to a new location), reevaluate compliance with public dose limits and ensure proper security of gauges.

Posting Requirements

The following documents are posted at the permanent storage facility to permit the authorized users to view:
NRH-3 "Notice to Employees"

At the permanent storage facility the following documents are posted or a notice of where the authorized user can view the following:

• Title 180 NAC

Operating and Emergency Procedures applicable to activities under the license

The license, conditions or documents incorporated into the license by reference and amendments

Any notice of violation involving radiological working conditions, proposed imposition of civil penalties, or order issued to 180 NAC 1 and any response from the licensee.

Radiation Warning Signs:

“Caution (or Danger), Radioactive Material” sign: are posted at permanent facility & job sites where gauges are stored (unless documentation kept describing eligibility for exception described 180 NAC 4-035)

“Caution (or Danger), Radiation Area” signs are posted at gauge storage areas. The manufacturers’ information is kept on file to demonstrate that gauge radiation levels are too low to require posting of radiation area signs around gauge storage area as described in 180 NAC 4-034, or 4-035.

Routine Maintenance

- Perform routine cleaning and maintenance according to the manufacturer's instructions and recommendations. A copy of the appropriate manufacturer’s operation manual will be on hand and the maintenance instructions will be strictly followed.
- Non-routine maintenance or repair that requires the removal of the source or source rod is prohibited. Such operations will only be performed by the manufacturer or other specifically authorized persons.

Radiation Surveys

If damage is suspected, immediately notify the RSO, who will make arrangements to have the gauge survey as soon as possible. Refer to the emergency procedures for further instructions.

Emergency Procedures

In the event of a stolen, lost or missing gauge, authorized users will immediately notify the Radiation Safety Office (RSO), who will contact the Agency.

If the source fails to return to the shielded position (e.g., as a result of being damaged, source becomes stuck below the surface) or if any other emergency or unusual situation arises (e.g., the gauge is struck by a moving vehicle, is dropped, is in a vehicle involved in an accident):

- Immediately secure the area and keep people at least 15 feet away from the gauge until the situation is assessed and radiation levels are known. However, perform first aid for any injured individuals and remove them from the area only when medically safe to do so.
- If any heavy equipment is involved, detain the equipment and operator until it is determined there is no contamination present.
- Gauge users and other potentially contaminated individuals should not leave the scene until emergency assistance arrives.
- Notify the persons in the listed below of the situation:

***Radiation Safety Officer:** _____

***RSO Phone No.: (w) _____ (H) _____**

Nebraska Health and Human Services Regulation and Licensure

Radioactive Materials Program (402)471-2168 (Monday-Friday 8AM – 5PM)

Off Hours: (State Patrol) (402) 471-4545 (Ask to speak to the NEMA Duty Officer as you have an incident to report involving radioactive materials.)

**Fill in with (and update, as needed) the names and telephone numbers.*

- Follow the directions provided by the person contacted above.

If damage should occur during transport:

At the earliest practical moment, the U.S. Dept. of Transportation will be notified of an accident that occurs during the course of transport in which fire, breakage, spillage or suspected contamination occurs involving shipment of radioactive materials, in accordance with 49 CFR 171.15. U.S. Department of Transportation Notification No: (800)424-8802

RSO AND LICENSEE MANAGEMENT:

- Arrange for a radiation survey to be conducted as soon as possible by a knowledgeable person using appropriate radiation detection instrumentation. This person could be a licensee employee using a survey meter located at the jobsite or a consultant. To accurately assess the radiation danger, it is essential that the person performing the survey be competent in the use of the survey meter.
- If gauges are used for measurements with the unshielded source extended more than 3 feet below the surface, contact persons listed on the emergency procedures need to know the steps to be followed to retrieve a stuck source and to convey those steps to the staff on site.
- Make necessary notifications to local authorities as well as the Agency as required. (Even if not required to do so, you may report ANY incident to Agency at (402) 471-2168 Agency notification is required when gauges containing radioactive material are lost or stolen, when gauges are damaged or involved in incidents that result in doses in excess of 180 NAC 4-059 limits, and when it becomes apparent that attempts to recover a source stuck below the surface will be unsuccessful.

- Reports to the Agency must be made within the reporting timeframes specified by the regulations.

Reporting requirements are found in 180 NAC 4-057-059 and 180 NAC 3-026.

Portable Gauge Emergency Response Information

This form with shipping papers will be in the vehicle and immediately accessible to the driver during transport.

- 1) **SHIPPING NAME AND HAZARD CLASS:** RQ, Radioactive Material, special form, n.o.s. UN 2974, Class 7, Type A package

POTENTIAL HAZARDS

2) **IMMEDIATE HAZARDS TO HEALTH**

- External radiation hazard from unshielded radioactive material.
- Low-level radioactive material; little personal radiation hazard when shielded.
- Materials in special form are not expected to cause contamination in accidents.
- Some radioactive materials cannot be detected by commonly available instruments.
- Potential internal radiation hazard from inhalation, ingestion, or breaks in skin, only if special form capsule is breached.

3) **FIRE OR EXPLOSION**

- No risk of fire or explosion.
- Radioactivity does not change flammability or other properties of the materials.

EMERGENCY PROCEDURES

4) **IMMEDIATE PRECAUTIONS**

- Isolate hazard area to within a 10-15 foot radius of the gauge and restrict access.
- Emergency response actions may be performed prior to any measurement of radiation; limit entry to shortest time possible.
- Notify local authorities and Nebraska's Health and Human Services Regulation and Licensure, Radiological Health Division of accident conditions.
- Detain uninjured persons, isolate equipment with suspected contamination, and delay cleanup until receiving instruction from Nebraska's Health and Human Services Regulation and Licensure, Radiological Health Division.

5) **FIRE**

- Do not move damaged containers; move undamaged containers out of fire zone.
- Small Fires: Dry Chemical, CO₂, water spray, or regular foam.
- Large Fires: Water spray, fog (flooding amounts).

6) **SPILL OR LEAK**

- Do not touch damaged containers or exposed contents.
- Damage to outer container may not affect primary inner container.
- Special form capsules are not expected to leak as a result of an accident or fire.

7) **FIRST AID**

- Use first aid treatment according to the nature of the injury.
- Advise medical personnel that victim may be contaminated with low-level radioactive material.
Except for the injured, detain persons exposed to radioactive material until arrival or instruction of Nebraska's Health and Human Services Regulation and Licensure, Radioactive Materials Division.

CALL THE FOLLOWING FOR EMERGENCY ASSISTANCE:

RADIATION SAFETY OFFICER: _____

RSO TELEPHONE #: _____

Nebraska's HHS R & L, Radiological Health Division.....(402) 471-2168 (M-F 8Am to 5PM)

After hours- Nebraska State Patrol..... (402) 471-4545 (Ask to speak to the NEMA Duty Officer as you have an incident to report involving radioactive materials.)

U.S. DEPT. OF TRANSPORTATION.....(800) 424-8802

CPN INTERNATIONAL, INC.....(800) 535-5053

HUMBOLDT SCIENTIFIC, INC.....(800) 992-4589

SEAMAN NUCLEAR CORPORATION.....(414) 762-5100

TROXLER ELECTRONIC LABORATORIES, INC.....(919) 839-2676